

Prevalence of missing permanent teeth in 9-14 years dental patients in Sulaimani city - Radiographic study.



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Abstract

Objectives: The purpose of this study was to establish the prevalence of missing permanent teeth in a sample of dental patients.

Materials and Methods: A total of 1133 digital OPG images, for students aged between 9-14 years, were retrieved from archived records. All the digital images were evaluated on the computer screen for determining the number, type and site of missing teeth in relation to age and sex.

Results: The prevalence of hypodontia was 14.1% (6% for males, 8.1% for females) with no sex variation. Most cases (51.28%) with hypodontia had only one missing tooth (21.79% for males, 29.49% for females). The most commonly missing teeth were the maxillary lateral incisors (37.8%), followed by the mandibular second premolars (34.1%).

Conclusions: High prevalence of missing teeth could be reported depending on OPG alone. Single tooth loss, maxillary jaw, and left side were the common features of missing permanent teeth in teenagers of our sample.

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Introduction:

Dental agenesis of one or more teeth is the mostly common anomaly of dental development in man⁽¹⁾. Various definitions are used in the literature to describe this phenomenon. Anodontia denotes complete dental agenesis. Oligodontia referred to patients with the absence of six or more teeth, apart from the third molars. Hypodontia is used to indicate the congenital absence of one to six teeth (excluding third molars)^(2,3).

Clinicians agree that tooth agenesis regardless of gender or race becomes more prominent in societies⁽¹⁾. The meta-analysis confirms that hypodontia has been diagnosed more often⁽⁴⁾. It is not known whether this observation is an aberration related to better detection methods and increase patient's awareness or whether it is a real trend toward increased prevalence of dental abnormalities.

The reported prevalence of missing teeth, excluding third molars, depends on the population studied. Large differences have been reported, varying from 0.3 to 36.5%⁽³⁾. In African Americans, agenesis has been estimated to be 7.7% with the mandibular second premolar most frequently missing. Studies in Japan have demonstrated tooth agenesis in 9.2% of that

population, mostly affecting the mandibular lateral incisor⁽¹⁾. In Europeans, 5.5% fail to develop one or more permanent teeth. In Turkish patients, it constitutes 5%⁽⁵⁾. However, in Iranian patients the prevalence was approximately 10.9% the most frequent congenitally missing teeth was mandibular second premolars⁽⁶⁾. In adult Iraqis, the frequency of missing upper laterals alone was 2% patients⁽⁷⁾. Lastly, in Sulaimani Kurdish students the prevalence was 3.1%⁽⁸⁾.

The importance of evaluating hypodontia in a community is vital since it can contribute to the masticatory dysfunction, speech alteration, and esthetic problem, in addition to malocclusion⁽⁹⁾. Furthermore, Lammi et al. proposed an intriguing possibility that tooth agenesis may be used as an indicator of susceptibility to colorectal cancer⁽¹⁰⁾.

Although the exact etiology of hypodontia in most cases is obscure. Many theories have been suggested and attributed the causes to be hereditary, environmental factors⁽²⁾, and evolutionary⁽¹¹⁾. Mutations in MSX1, PAX9, AXIN2, WNT10A and the ectodermal dysplasia genes and their receptors have been detected. However, until recently, in the majority

of cases the genetic factor could not be identified⁽¹²⁾. Moreover many environmental factors, local trauma in the dental region (fractures, surgical procedures and extraction of the preceding primary) can arrest tooth development⁽²⁾.

The early diagnosis, prevention, and eventually therapeutics are becoming integral parts of health care. The tooth considered congenitally missing if it has not erupted in the oral cavity and is not visible in a radiograph⁽²⁾, thus excluding the clinical missing (impacted or unerupted tooth). The best view of its assessment and diagnosis in one glance is the panoramic radiograph (OPG).

This study aims to; 1) establish the prevalence of missing permanent teeth in a sample of dental patients with wider age range. 2) find their dental need and treatment planning and, 3) compare our finding with previous data and monitor changing in the prevalence in our selected sample.

Materials and Methods:

A total of 1133 digital OPG images, for patients aged between 9-14 years, were retrieved from archived records in the radiology departments of Piramerd dental center (1022cases) and school of dentistry (111 cases) over a period of 4 years from 2006 to 2010. Only 25 unclear OPGs were excluded. All the digital images were reevaluated on the computer screen with a magnification of 50%, starting from the upper right quadrant ending with the upper left quadrant then from lower right quadrant ending with the lower left quadrant. The age and sex of each patient beside the number and type of missing teeth were recorded.

Raw data were statistically analysed using both descriptive (tables with percentage and graphics) and inferential (Chi-square test and t-test) statistics.

Results:

Out of the total (1108) cases, 156 (14.1%) had hypodontia (6% males and 8.1% females), table (1). The missing teeth were observed slightly more in the maxilla (54.74%) than in mandible (45.26%), table (2). Eighty-seven cases (55.76%) have unilateral hypodontia (asymmetrical) while bilateral hypodontia

Table 1: The frequency and percentage distribution of the hypodontic case by gender.

Gender	Sample		Hypodontia	
	No.	%	No.	%
Male	495	44.7	67	6
Female	613	55.3	89	8.1
Both	1108	100	156	14.1

Table 2: The frequency and percentage distribution of missing teeth by arch.

Arch	No.	%	Sex1	Sex2	P value
Maxilla	98	54.74	45	53	0.566
Mandible	81	45.26	33	51	

was seen in 69 cases (44.24%), with no sex variation, table (3).

Most of the cases had one missing permanent tooth (n= 80, 51.28%) with slight females tendency. Two hypodontic teeth (33.97%) were the second in the ranking. The missing of more than two teeth constituted only a small percentage of the total sample (14.74%), table (4).

The frequency and percentage distribution of missing teeth in relation to age groups indicate that it does not change; however, there was a slight increase in 13-14 years students, with no sex variation, table (5).

The most frequently missed tooth was lateral incisor (37.8%) followed by 2nd premolar (34.1%), figure (1). The loss of central incisors and 1st premolar and 1st molar were nearly equal (table 6). Canine and 2nd molars were the least missing teeth. The frequency distribution of the type of missing teeth showed significant sex differences.

Table 3: The frequency and percentage distribution of missing teeth by site symmetry.

Gender	Bilateral		Unilateral		Right		Left		P-value
	No.	%	No.	%	No.	%	No.	%	
Male	32	47.77	35	52.23	17		18		0.499
Female	37	41.58	52	58.42	20		32		
Total	69	44.24	87	55.76	37	24.4	50	32.1	

Table 4: The frequency and percentage distribution of missing teeth by number and sex.

No.	Male		Female		P value	Total	
	No.	%	No.	%		No.	%
1 tooth	34	21.79	46	29.49		80	51.28
2 teeth	23	14.74	30	19.23		53	34.97
3 teeth	5	3.205	5	3.205		10	6.41
4 teeth	4	2.57	3	1.92	0.698	7	4.49
5 teeth	0	0	3	1.92		3	1.92
6 teeth	1	0.64	1	0.64		2	1.28
7 teeth	0	0	1	0.64		1	0.64

Table 5: The frequency and percentage distribution of missing teeth by age group.

Age years	Male		Female		P value	Total	
	No.	%	No.	%		No.	%
9-10	25	16	22	14.1		47	30.1
11-12	18	11.5	23	14.8	0.161	41	26.3
13-14	24	15.4	44	28.2		68	43.6
Total	67	43	89	57		156	100

**Figure 1: Bilateral missing upper lateral incisors of lower left 2nd premolar.**

Table 6: The frequency and percentage distribution of missing teeth by type in both sexes.

Teeth 260	Total		Male		Female		P value	
	No.	%	No.	%	No.	%		
Centrals	20	6.7	19	13.6	1	0.62		
Laterals	113	37.8	60	43.2	53	33.12		
Canines	11	3.7	4	2.87	7	4.37	0.001	
Premolars	1st	23	7.7	10	7.2	13	8.12	
	2nd	102	34.1	33	23.7	69	43.1	
Molars	1st	18	6.02	9	6.47	9	5.62	
	2nd	12	4.01	4	2.88	8	5	

Discussion:

The prevalence of missing permanent teeth depending mainly on archival OPG radiographs is (14%). This is much higher than that reported by Rauf (3.1%) in his clinic-radiographical study on 13-14 years students⁽⁸⁾ and other studies (Al-Mulla 5.85%⁽¹³⁾, Aasheim and Ogard (9 years Norwegian) 6.5%⁽¹⁴⁾, Al-Judo (12-18 years old Jordanian) 5.86%⁽¹⁵⁾). Such discrepancy related mainly to the methodological variation and partly to age of studied group. Nevertheless, congenital missing teeth will not increased by age (after 14) since we exclude the wisdom teeth. Therefore, radiographical evaluation alone will estimate all possible cause for teeth loss other than congenital hypodontia.

There was a slight predominance of missing in females. This is in agreement with with Rauf's results in Sulaimani students⁽⁸⁾ and Peker, et al⁽¹⁶⁾, while it disagreed with Al-Judo⁽¹⁵⁾ for Jordanian teenagers who found higher percentage of hypodontia in males than in female.

In this study, missing teeth were seen more frequently in upper jaw. This mainly attributed to the fact that upper lateral incisors constitute the majority of missing teeth in both sexes. This is agree with the results of Muller et al⁽¹⁷⁾ and Rauf⁽⁸⁾ but disagrees with that of Al-Judo⁽¹⁵⁾.

Previous study remarks to lack of difference in the existence of missing teeth between the right and left sides⁽¹⁸⁾. Nevertheless, in our study, females had more missing teeth on the left side. This agrees with Farhat's findings⁽¹⁹⁾ but disagrees with another study where more teeth were missed from right side of jaws⁽²⁰⁾.

Most of our cases had only one tooth missing and predominantly in females, this is similar to results found by Al-Judo⁽¹⁵⁾ and Rauf⁽⁸⁾ but unlike the results found by Castaldi⁽²¹⁾, and Hatziotis and Verzirdizi⁽²²⁾. They found that two teeth hypodontia has the highest

prevalence. Therefore, in our community, the treatment planning and management may be easier since it depend on the number of missing teeth and the requested space to restore the dentition either by orthodontic treatment or prosthesis⁽²³⁾.

Concerning the most common missed tooth, results of the present work is in line with previous published works. It showed that upper lateral incisor was the most frequently absent tooth followed by the lower second premolar (Muller et al, Augard and Gayard, and Rauf, 62.1%)^(17,24,8). Herein, dentists should make every effort to recognize those teenagers with missing anterior teeth at early time. Such situation greatly affects their esthetic and psychology, and lead to loss of the requested space for treatment. Accordingly this will minimize the time, cost, and efforts spend by the family, patients and dentist. Furthermore, it has been remarked that an early detection of missing teeth will provide chance to select alternative treatment with a multidisciplinary team approach to establish an aesthetic and functional dentition and to minimize the complications of hypodontia⁽¹⁸⁾.

Conclusions:

1. The prevalence of missing permanent teeth depending mainly on archival OPG radiographs is (14%) with female predominance.
2. Single tooth loss, maxillary jaw and left side were the common features of missing permanent teeth in teenagers of our sample.
3. Maxillary lateral incisor followed by mandibular 2nd premolar were the most missed-teeth.

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